Simplify each expression using the order of operations.

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$$2^2 + 5 \bullet 3$$

$4 + 5 \cdot 3$

$4 + 15$

(19)

$$(6+2) \div (4^2 - 8)$$

$8 \div (4^2 - 8)$

$8 \div (16 - 8)$

$8 \div 8$

(1)

$$5 - 3 + 2(4-1)$$

$5 - 3 + 2(3)$

$5 - 3 + 6$

$2 + 6$

(8)

Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples
Order of Operations	The order in which you simplify expressions

	P	parenthesis
	E	exponents
	M/D	multiply/divide in order
	A/S	add/subtract in order

Examples

Directions: Evaluate each expression.

1. $4 - 1 - (6 - 5)$ 2	2. $(5 + 4 - 3) \div 6$ 1
3. $(41 - 9) \div 4(-2)$ $32 \div 4(-2)$ $8(-2)$ -16	4. $5 \times 6 \div 6 - 6$ 30
5. $(13 - (6 - 5)) \div 4$ 3	6. $6 \times 10 \div (3 \times 2)$ 10

7. $(3^2 \times 2) \div 3$

6

8. $4 + 4^2 \div 2$

$4 + 16 \div 2$
$4 + 8$ **12**
$\boxed{12}$

9. $2^2(19 - 2 \times 4)$

88

10. $(11 - (2 + 3)) \div 6$

1

11. $(-6) - 7 + 6 \times 10$

47

12. $(-10) - (-6)^2 + 3^2$

$-10 - 36 + 9$
$-46 + 9$ **-37**

13. $(1-3)^2 + (4^3 - 15)$

$(-2)^2 + (4^3 - 15)$
$4 + (4^3 - 15)$ **53**
$4 + (64 - 15)$
$4 + 49$ $\boxed{53}$

14. $(-3) \times 4(-4 \times 2)$

$-3 \times 4(-8)$ **96**
$-12(-8)$
$\boxed{96}$

15. $\dfrac{-7 \cdot 2^4}{18 - 12 \div 3} - (-2)$

-6

16. $\dfrac{19 - 8 + 4}{5 - 2^3}$

-5

Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples

POWERS OF 10

Complete the table below to show the powers of 10.

POSITIVE POWERS

Power	Expanded Form	Value
10^5	$10 \cdot 10 \cdot 10 \cdot 10 \cdot 10$	100,000
10^4	$10 \cdot 10 \cdot 10 \cdot 10$	10,000
10^3		1,000
10^2		100
10^1		10
10^0		1

Negative powers of 10 can be written as fractions:

$$10^{-n} = \frac{1}{10^n}$$

NEGATIVE POWERS

Power	Fractional Form	Decimal Form
10^{-1}	$\frac{1}{10}$	0.1
10^{-2}	$\frac{1}{10} \cdot \frac{1}{10} = \frac{1}{100}$	0.01
10^{-3}	$\frac{1}{1000}$	0.001
10^{-4}	$\frac{1}{10,000}$	0.0001
10^{-5}	$\frac{1}{100,000}$	0.00001

SCIENTIFIC NOTATION

- Scientific notation is a __short__ way of writing very __large__ or very __small__ numbers using the powers of 10.
- A number written in scientific notation has the form $a \times 10^n$ where $1 \le a < 10$.

Scientific Notation to Standard Form

Converting scientific notation to standard form is easy! The exponent tells you the directions AND the number of places to move the decimal.

Directions: Write each number in standard form.

	Scientific Notation	Standard Form
1.	4.3×10^2	430
2.	2.19×10^7	21,900,000

3.	5×10^4	5<u>0</u>,<u>0</u> <u>0</u> <u>0</u>
4.	7.2×10^{-1}	.<u>7</u>.2
5.	3×10^{-4}	.<u>0</u> <u>0</u> <u>0</u> <u>0</u> 3,
6.	8.52×10^{-3}	.<u>0</u>0852

3.0

Standard Form to Scientific Notation

Step 1: Move to decimal so the new number is between 1 and a number up to 10.

Step 2: Write using a power of ten. The exponent matches the number of times the decimal was moved.

- If the decimal was moved _____ the exponent is _____.

- If the decimal was moved _____ the exponent is _____.

	Scientific Notation	Standard Form
7.	9×10^5	900,000
8.	2.4×10^3	2,400
9.	1.65×10^8	165,000,000
10.	4×10^{-2}	0.04.
11.	6.8×10^{-7}	0.00000068
12.	5.5×10^{-4}	0.000551

COMPARING VALUES

Directions: Place a <, > or = in the circle to complete each statement.

13. 8×10^5 ◯ 1×10^4		14. 5.52×10^2 ◯ 9.4×10^3
15. 7.54×10^2 ◯ 4.73×10^1		16. 9.89×10^{-6} ◯ 3.14×10^{-5}
17. 240,000 ◯ 1.7×10^4		18. 8×10^4 ◯ 800000
19. 5.2×10^{-8} ◯ 0.000000052		20. 0.0009 ◯ 7.5×10^{-2}

0.0005.51

Scientific Notation

Are the numbers written correctly in scientific notation? Write *yes* or *no*.

1.) 34.7×10^4 _____   2.) 8.09×10^7 _____   3.) 704×10^{10} _____

4.) 9.35×10^{11} _____   5.) 42.01×10^3 _____   6.) 3.005×10^6 _____

Indicate the correct power of 10 in the blanks below.

7.) $5,360 = 5.36 \times 10^?$ _____   8.) $7,030,000 = 7.03 \times 10^?$ _____

9.) $63307.3 = 633073 \times 10^?$ _____   10.) $5,030,000,000 = 5.03 \times 10^?$ _____

Write in scientific notation.

11.) 31,000 _____   12.) 207,000 _____

13.) 1,700,000 _____   14.) 53,804 _____

15.) 90.001 _____   16.) 2,340,000,000 _____

Write the numbers below in standard form.

17.) 2.0×10^2 _____   18.) 3.5×10^5 _____

19.) 6.03×10^8 _____   20.) 9.98×10^7 _____

21.) 4.205×10^{11} _____   22.) 8.136×10^{12} _____

Solve.

23.) One light year is about 5.88×10^{12} miles. What is this distance in standard form?

24.) The nearest star beyond the sun is about 2.5×10^{13} miles away. What is this distance in standard form?

Roundtable Expressions

A

#1 $(15 \div 5)^2 + 13 - 1$ #2 $2^3 + 3 \cdot 8 - 6$

#3 $20 - 10(10 - 8)$ #4 $30 - 12 \cdot 2$

B

#1 $18 \div 3 + 4 \cdot 7$ #2 $2 \cdot 4 - (8 - 4)^2 + 7^2 - 3$

#3 $2(9 \cdot 3 + 1) - 6 \cdot 8 - 2$ #4 $100 \div (16 + 9) \cdot 6$

C

#1 $2 + 6 \cdot 3 - \frac{8}{2}$ #2 $(8 + 4) \cdot (6 - 3)$

#3 $5^2 + \frac{14 + (6 \cdot 3)}{8} - 7 + 3$ #4 $2(105 \div 15 - 6)$

D

#1 $9 - 2 + 5$ #2 $12 - 2 \cdot 5 + 3$

#3 $(2 \cdot 11 + 1) - (3 \cdot 6 + 5)$ #4 $(14 + 6) - 15 + 4 \cdot 2^3 + 16$

Roundtable: Solving Equations

In your group, determine who will be member number 1, 2, 3 and 4. Write the names on this recording sheet.

#1 _____   #3 _____

#2 _____   #4 _____

Directions:

- Each person will solve the equation next to their number on their own paper. (Ex: person 1 solves equation one.)
- When all four equations are solved, add the solutions and write down the sum. **One person** from the group will show the teacher the sum. If you are correct you will earn two points. Begin the next equation.
- If you are incorrect on your first try, go back to your group and check your work. Add the solutions and the teacher will check your new sum.
- If you get it correct on your second try you will earn one point. If it is incorrect again, you will earn zero points. Begin the next equation.

A

      1st try: _____   2nd try: _____

B

      1st try: _____   2nd try: _____

C

      1st try: _____   2nd try: _____

D

      1st try: _____   2nd try: _____

Google Classroom assignment

Complete the powers of ten and submit for a classwork grade

IXL Practice

6th grade

E.1, E.2 scientific notation